I. Navy ODS Advisory 96-02

II. Subj: Refrigerant Leak Repair and Record Keeping

III. References: (a) 40 CFR 82 Subpart F--National Emission Reduction and Recycling Program
(b) OPNAVINST 5090.1B Chapter 6

IV. Cancellation: None

V. Applicability: All Navy Activities and Facilities Owning or Operating Air-Conditioning and Refrigeration (AC&R) Units Greater than 50 lbs

VI. Background:

1. The purpose of reference (a) is to reduce the emissions of Class I and Class II ozone-depleting refrigerants to the lowest achievable level during the service, maintenance, repair, and disposal of appliances in accordance with Section 608 of the Clean Air Act.

2. Reference (a) defines an appliance as any device that contains and uses a Class I or Class II Ozone-Depleting Substance (ODS) as a refrigerant and that is used for household or commercial purposes, including any air conditioner, refrigerator, chiller, or freezer. In order to meet the requirements of reference (a), the repair of substantial refrigerant leaks in all appliances normally containing more than 50 lbs of refrigerant is required. NOTE: Equipment that is military unique (as defined in reference (a)) is not included in the definition of appliance and therefore not subject to the reference (a) requirements or this advisory.

3. Reference (a) also requires owners of appliances to maintain certain records for possible inspection by regulatory personnel.

VII. Action:

A. Commercial-Refrigeration and Industrial-Process-Refrigeration Equipment:

1. Reference (a) states that owners of commercial refrigeration and industrial process refrigeration equipment normally containing more than 50 lbs of refrigerant must have all leaks repaired if the equipment is leaking at a rate such that the loss of refrigerant will exceed 35 percent of the normally installed charge during a 12-month period. Commercial refrigeration is defined as refrigeration appliances utilized in the retail food and cold storage warehouse sectors. Retail food includes the refrigeration equipment found in supermarkets, convenience stores, restaurants and other food-service establishments. Cold storage includes the equipment used to store meat, produce, dairy products, and other perishable goods. Industrial process refrigeration means complex customized appliances used in the chemical, pharmaceutical, and manufacturing industries. This also includes industrial ice machines and ice rinks.

B. Appliances Not Covered Under The Previous Paragraph:

1. Owners and operators of appliances, normally containing more than 50 lbs of refrigerant and not covered under the previous paragraph must have all leaks repaired if the appliance is leaking at a rate such that the loss of refrigerant will exceed 15 percent of the normally installed charge during a 12-month period. Appliances covered under this paragraph include building air-conditioning units and chillers.

C. Allowable Time To Repair Refrigerant Leaks:

1. Owners and operators are required to repair the leaks defined in the previous paragraphs within 30 days of discovery or within 30 days of when the leak(s) should have been discovered. Under extreme, extenuating circumstances, an extension to the 30 days may be allowed. Refer to reference (a) for a complete explanation of the procedures for an extension. To ensure compliance with the above requirements, reference (a) requires owners of appliances containing 50 or more pounds of refrigerant to keep certain records. This advisory provides sample forms that may be used for compliance.

D. Method By Which To Measure And Monitor Refrigerant Leakage: Attachments (1) and (2) are provided to assist owners and operators comply with the requirements of reference (a). These forms are provided for guidance only and may be revised or substituted to suit individual needs. Note that in addition to these forms, owners of equipment who add their own refrigerant must keep records of all refrigerant purchased. The rate at which refrigerant is leaking from an appliance can be estimated using the following procedure:

1. Attachment (1) is a day-to-day Service/Maintenance Report Log that can be used to document all service and maintenance conducted on appliances. Attachment (1) is used to keep track of an appliance's refrigerant consumption. This form is also used to estimate an appliance's leakage rate in order to determine compliance with reference (a).

2. Identify Total Installed Charge: The total installed charge of an appliance may be obtained from any of the following:

- manufacturer data,
- system manual,
- nameplate data,
- calculation,
- actual measurements of the amount of refrigerant added or evacuated from the appliance, or
- use of an established range, based on the best available data, regarding the normal operating characteristics and conditions for the appliance.

Additional record keeping is required when using the range method. See 40 CFR 82.166(q) for additional requirements.

3. Identify Maximum Allowable Annual Leakage Rate: Using the definitions in paragraphs VII.A. and VII.B., above, determine whether the maximum allowable annual leakage rate for the appliance is 15% or 35%.

4. Net Leakage: The net leakage of an appliance is equal to the appliance's net refrigerant leakage or net refrigerant consumption. Between refrigerant chargings, it is possible that refrigerant has been removed (or recovered) from an appliance or an accidental discharge or venting may have occurred. Failure to record and account for refrigerant removal and accidental discharges will cause the technician to calculate higher-than-actual leakage rates. Therefore, refrigerant removal and accidental discharges should always be recorded by technicians. The net leakage is often calculated each time refrigerant is added to an appliance and covers the period of time since refrigerant was last added to the appliance. The net leakage can be calculated as follows: Net Leakage (lbs) Since Last Charging = (Refrigerant Added (lbs) Since Last Charging) - (Refrigerant Removed (lbs) Since Last Charging) - (Losses Due To Accidental or Unintentional Venting (lbs) Since Last Charging).

5. Annualized Leakage Rate: The annualized leakage rate can be estimated by dividing the appliance's net refrigerant leakage (paragraph 4, above) by its installed charge (paragraph 2, above) and prorating the result over the entire year. The following formula may be used:

$$\text{Annualized Leakage Rate (\%)} = \frac{\text{Net Leakage (lbs)}}{\text{Installed Charge (lbs)}} \times \frac{\text{365 (days/yr)}}{\text{Days Since Refrigerant Last Added (days)}}$$

The result of this formula should be compared to the appliance's maximum allowable annual leakage rate (paragraph 3, above). If the appliance is exceeding its maximum allowable annual leakage rate, then the owner or operator of the appliance should take immediate action to repair refrigerant leaks in accordance with reference (a) and paragraph VII.C., above.

6. Attachment (2) is an Accidental or Unintentional Venting Report that should be used to track refrigerant loss due to inadvertent venting.

E. Points of Contact:

1. CNO
   (a) Ms. Catharine Cyr, CNO N451I, (703) 602-5335, DSN 332-5335, facsimile (703) 602-2676, cyrc@n4.opnav.navy.mil.

2. COMNAVSEASYSCOM
   (a) Ms. Deborah Verderame, NAVSEA 07E2, (703) 602-4060 x351, DSN 332-4060x351, verderame_deborah_h@hq.navsea.navy.mil.

3. COMNAVAIRSYSCOM
   (a) Mr. Jim Homan, Naval Air Systems Command, NAVAIR 4.3.5, (703) 604-3413x8687, DSN 664-3413 x8687, homan_jm.ntrprs@navair.navy.mil.

4. COMNAVSUPSYSCOM
   (a) Mr. Robert Law, NAVSUP 4241A, (703) 607-0312, DSN 664-0312, robert_law@navsup.navy.mil.

5. COMNAVFACENGCOM
   (a) Mr. Felix Mestey, NAVFAC 41FM, (703) 325-8539, DSN 221-8539, fmestey@hq.navfac.navy.mil.

6. COMSC
   (a) Mr. John Austin, MSC, (202) 685-5042, john.austin@SMTPGW.MSC.navy.mil.

7. For general questions on ODSs or to receive information on alternatives to ODSs, contact the Navy CFC & Halon Clearinghouse, (703) 769-1883, navyozone@aol.com.

F. Incorporation of Advisory:

1. This advisory will be incorporated in the next revision of reference (b).

VIII. Advisories In Effect:

Advisory	Subject	Applicability
95-01	Mission-Critical Applications of Class I Ozone-Depleting Substances	All Navy Operating Forces and all Activities and Facilities Supporting Operational Units
96-01	Ozone-Depleting Substance (ODS) Supply Support	All Navy Operating Forces, New Ship Construction, and all Activities and Facilities Supporting Operational Units
96-02	Refrigerant Leak Repair and Record Keeping	All Navy Activities and Facilities Owning Or Operating Air-Conditioning and Refrigeration (AC&R) Units Greater than 50 lbs

Service/Maintenance Report Log

Appliance/Unit Number _____ Total Installed Charge _____ Maximum Allowable Annual Leakage Rate [1] _____

Date	Service / Maintenance Action	Technician	Refrigerant Added (lbs)	Refrigerant Removed (lbs)	Loss Due To[2] Accidental Venting (lbs)	Net Leakage[3] (lbs)	Annualized Leakage Rate[4] (%)	Leak Repaired (Yes/No/NA)	Comments

Notes:

1. Maximum Annual Leakage = 35% (Refrigeration) or 15% (Air Conditioning).
2. Each time an accidental or unintentional release occurs, the technician must document the release on an accidental/unintentional release form (Attachment (2)).
3. Net Leakage (lbs) Since Last Charging = Refrigerant Added (lbs) Since Last Charging - Refrigerant Removed (lbs) Since Last Charging - Loss Due to Accidental or Unintentional Venting (lbs) Since Last Charging.
4. Annualized Leakage Rate = (Net Leakage/Installed Charge) x (365 / Number of Days Since Refrigerant Last Added).

Attachment (1)

Accidental or Unintentional Venting Report

Date _____

Location_____

Refrigerant Unit _____

Type of Refrigerant Vented _____ Approx. How Many Pounds Were Vented _____

Description of Accidental Venting Incident _____

_____

_____

_____

_____

_____

_____

_____

_____

What Was the Cause of the Release? _____

_____

_____

_____

What Precautions Have Been Taken To Prevent This From Happening Again? _____

_____

_____

_____

Technician Name/Rank or Grade _____ Certification Number _____

Supervisor Signature _____ Date _____

Supervisor Printed Name and Rank or Grade _____

Maintain For Record Purposes For 3 Years

Attachment (2)